



PATENT APPLICATION  
Mo8675  
LeA 34,919

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN APPLICATION OF

STEFFEN HOFACKER ET AL

SERIAL NO.: 10/054,386

FILED: JANUARY 22, 2002

TITLE: TWO-COMPONENT  
POLYURETHANE BINDERS  
AS PRIMERS

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) GROUP: 1711  
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) EXAMINER: R. F. GORR  
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DECLARATION UNDER 37 CFR § 1.132

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

I, Steffen Hofacker, residing at Gießener Str. 33, 35510 Butzbach, Germany, do declare and state as follows:

1. I am one of the named inventors of the invention described and claimed in the above-captioned application.

2. I am familiar with the subject matter of the above-identified application and of the subject matter of WO 01/98393 A1, JP 04 239537, and U.S. Patent No. 4,409,266.

3. In order to demonstrate the efficacy of a particularly effective embodiment of the present invention over the combined disclosure of the cited prior art references, the following comparative experiments have been made. The numbering of the experiments follows from the numbering in the present application. The examples demonstrate adhesive and optical properties of the 2-component polyurethane (PUR) binders used in a primer according to the invention.

### Example 32

6.4g of the silicon-modified polyisocyanate described in table 14, number 14 in the present application was added to 35.2g of polyol B4 from table 2 (in this example, B4 was prepared without the uv-absorbers TINUVIN® 292 and TINUVIN® 1130) and mixed at room temperature (NCO:OH ratio of 1.2:1). The resulting PUR binder was applied by centrifugal casting as a layer about 0.2 µm thick to a polycarbonate sheet (MAKROLON®, Bayer AG) and cured for 30 minutes at 110°C. Next, a silicon-containing coating, as described in EP-A 0 947 520, example 14, was applied by centrifugal casting as a layer about 3 µm thick and cured for 60 minutes at 130°C.

### Comparison example 4

Using the same procedure as in example 32, instead of using diacetone alcohol (DAA) (see table 2) as solvents in polyol B4, only butyl acetate was used.

### Comparison example 5

Using the same procedure as in example 32, instead of using diacetone alcohol (DAA) and butyl acetate as solvents in polyol B4, only ethyl acetate was used, including use with the polyester DESMOPHEN® 670.

### Comparison example 6

Using the same procedure as in example 32, instead of using diacetone alcohol (DAA) as solvents in polyol B4, a mixture of butyl acetate and ethyl acetate, at a weight ratio of 1:1 was used.

The polycarbonate sheets coated as described in example 32 and comparative examples 4-6, were tested for adhesion and light scattering (haze) before and after being stored in deionized water for 8 hours at 100°C.

Adhesion was tested using the cross-hatch adhesion test described in DIN EN ISO 2409.

Cross-hatch adhesion test characterizing values:

- 0 – no detachment at all
- 5 – complete detachment

Mo-7247

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-- - test not performed

Haze was determined according to ASTM 1003, characterized as follows:

0.0 – 2.5% - none to little haze, full to mostly transparent

2.6 – 50.0% - partly hazy to having haze, partly transparent

50.1 - 100% - strong to full haze, slightly transparent to not transparent

The results are shown in the table below.

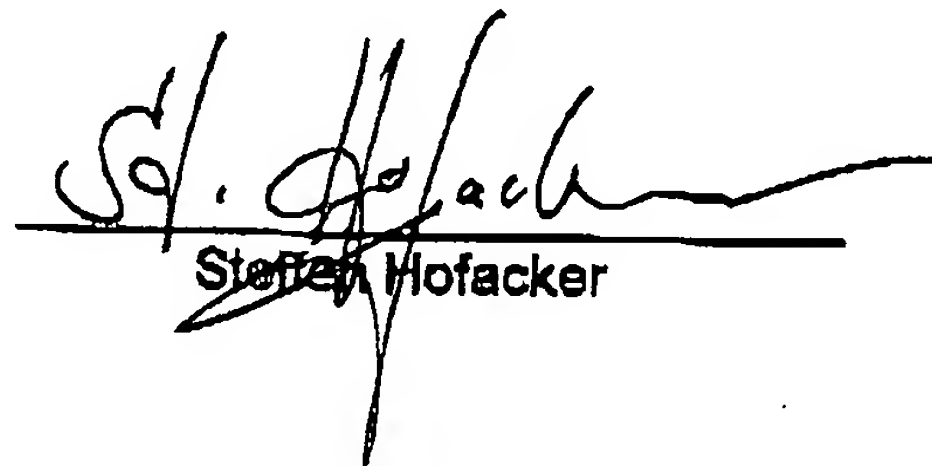
	Adhesion before water storage	Haze before water storage	Adhesion after water storage	Haze after water storage
Example 32 primer without topcoat	0	0.4%	0	0.5%
Example 32	0	0.4%	0	0.5%
Comp. Ex. 4 primer without topcoat	0	16.0%	0	--
Comparative Example 4	0	--	0	3.7%
Comp. Ex. 5 primer without topcoat	0	3.4%	0	--
Comparative Example 5	0	--	0	3.2%
Comp. Ex. 6 primer without topcoat	0	23.0%	0	--
Comparative Example 6	0	--	0	4.6%

The data show that the 2-component PUR binders containing DAA, butyl acetate, ethyl acetate, or mixtures thereof, used as primers in accordance with the invention, provide organic modified inorganic coatings on polymer substrates with good adhesion and exceptionally good haze values. Primer systems known from the prior art provide organic modified inorganic coatings on polymer substrates with substantial haze before and after storage in water.

In particular, when DAA or mixtures of DAA and butyl and/or ethyl acetate are used in primers according to the invention, good adhesion results and the best haze results are obtained for organic modified inorganic coatings on polymer substrates.

4. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Leverkusen, this 12<sup>th</sup>  
day of January, 2004.

  
Stefan Hofacker

Mo-7247

-4-